

Coupling for a Fluid Conducting System

The invention pertains to a coupling for a fluid conducting system, having a coupling part into which an insertion section of a counterpart can be inserted, and having a locking part which is mounted in movable fashion on the coupling part and which possesses a detent structure which in a detent position interacts with a complementary structure configured on the insertion section for locking the counterpart and the coupling part.

Such a coupling is known from DE 101 41 315 C1. The previously known coupling possesses a coupling part into which an insertion section of a counterpart can be inserted. Also present is a C-shaped locking part which is mounted on the coupling part so that it can rotate around the longitudinal axis of the coupling. As the detent structure, the locking part possesses sections which are like segments of a circle and which in a detent position interact, through the fact that they engage in recesses configured on the coupling part and the insertion section, with a complementary structure configured on the insertion segment for locking the counterpart and the coupling part in a locking position. When the locking part is rotated around the longitudinal axis of the coupling, the sections which are like segments of a circle slide out of the recesses while bending the locking part upward, and release the insertion section in a release position. To facilitate the rotation, gripping grooves or nubs are present on the outside of the locking part.

When operating the previously known coupling, however, in a certain sense it turned out to be disadvantageous that the release position exhibited a certain instability, since under the effect of a relatively low force on the coupling part,

the latter changes over directly from the release position into the locking position in an abrupt fashion. In addition, the transfer of the coupling part from the locking position into the release position by rotating it has not proven to be optimal because of the relatively large amount of space required for doing this. Finally, performing the rotating movement with a locking part having smooth walls, after the gripping grooves or nubs have worn off, for example, is sometimes not without problems.

The invention is based on the task of suggesting a coupling of the type mentioned at the beginning which is distinguished by improved operation.

With a coupling of the type mentioned at the beginning, this task is inventively solved in that the locking part is configured with two side sections that are parallel to each other, that at least one longitudinal detent element is configured on each of the side sections' insides facing the coupling part, that a latching structure is present in the region of the free ends of the side sections, that the coupling part is configured with guide recesses that lie opposite each other and into which the detent elements engage, and that the coupling part is equipped in the region of one end of the guide recesses with a latching structure that is configured complementary to the detent structure.

Through the inventive configuration of the coupling, the movement of the locking part between the release position and the locking position takes place essentially in a linear direction perpendicular to the longitudinal direction of the coupling so that relatively problem-free operation is possible even in narrow spaces. In addition, this results in the advantage that the release position in particular exhibits relatively high stability against the effects of external forces,

so that an unintentional snapping of the locking part into the locking position is made more difficult at the least.

Additional useful developments of the invention are the objects of the subclaims.

Additional useful developments and advantages arise from the following description of a preferred embodiment of the invention, including references to the figures of the drawing. The following are shown:

Fig. 1        a perspective view of a preferred embodiment of the invention, having a coupling part and a locking part that is arranged in a release position in the representation according to Fig. 1, and an insertion section of a counterpart that is arranged at a distance from the coupling part,

Fig. 2        a perspective view of the embodiment according to Fig. 1 in a cutaway through the coupling part and the locking part arranged in a locking position, and through the insertion section that is inserted into the coupling part, and

Fig. 3        a perspective view, partially cut away in the longitudinal direction, of the embodiment according to Fig. 1 and Fig. 2.

Fig. 1 shows a perspective view of an embodiment of an inventive coupling, having a elongated coupling part 1 which possesses a connection fitting 2 on one side. A flexible hose of, for example, a fluid conducting system, not shown in

Fig. 1, can be slipped onto the connection fitting 2, which is preferably configured with a cross section that varies in the longitudinal direction and is tapered at the end. At an insertions side 3 that is opposite the connection fitting 2, coupling part 1 is configured with an insertion opening 4 that is round in cross section, into which a counterpart, shown in Fig. 1 at a distance from the coupling part 1 and with an elongated, essentially cylindrical insertion section 5, can be inserted.

The insertion section 5 of the counterpart possesses a circumferential securing recess 6, which is delimited on the edge side by a first edge shoulder 7, which is arranged on the edge side in the region of the free end of the insertion section 5, and a second edge shoulder 8 that lies opposite the first edge shoulder 7. The insertion section 5 is, for example, configured as an end fitting that is placed on a fluid reservoir of the fluid conducting system or that can be connected to one end of another flexible hose of the fluid conducting system. On its end section that faces the insertion side 3 immediately before insertion, when operated properly, into the coupling part 1, the insertion section 5 exhibits an insertion bevel 9 to facilitate insertion into the coupling part 1.

Between the connection fitting 2 and the insertion side 3, the coupling part 1 is configured with a coupling section 10, which is thicker than the connection fitting 2 and in which there are guide recesses 13, which are placed laterally and which extend from a top element 11 to a base element 12, and thus perpendicular to the longitudinal direction of the coupling part 1. Present in the longitudinal direction of the coupling part 1 on both sides of the guide recesses 13 are sliding surfaces 14, 15, which are offset inward relative to the outside of the coupling

section 10 and are slightly convex, and which are configured in their end regions facing the base element 12 with locking recesses 16, 17 as a detent structure, and in their end regions facing the top element 11 with the releasing recesses 18, 19 as a releasing structure. The locking recesses 16, 17 and the releasing recesses 18, 19 are aligned in the longitudinal direction of the coupling part 1.

In addition, the preferred embodiment shown in Fig. 1 is equipped with an essentially U-shaped locking part 20, which is detachable mounted on the coupling part 1 and which possesses a top section 21 that is flat on the outside and two side sections 22, 23, which are configured onto the top section 21 at a right angle and which are also flat on the outside. Configured on the inside of each side section 22, 23 are inwardly concave detent elements 24, 25, which are matched to the dimensions of the guide recesses 13 and which engage in the latter. The inside diameter of the locking part 20 in the region of the concavities of the detent elements 24, 25 is slightly smaller than the outside diameter of the insertion section 5 in the region of the securing recesses 6 in order to generate a prestress. Configured as a latching structure on the side sections 22, 23 in the region of the ends of the detent elements 24, 25 that face away from the top section 21 and aligned therefrom in the longitudinal direction of the coupling part 1 are protruding latching projections 26, 27 that are dimensioned for engagement into the locking recesses 16, 17 and the releasing recesses 18, 19.

In the representation according to Fig. 1, the locking part 20 is positioned in a sprung releasing position in which the latching projections 26, 27 are in engagement with the locking recesses 18, 19.

Fig. 2 shows a perspective view of the embodiment according to Fig. 1 in cutaway through coupling part 1 and the locking part 20, which is arranged in a locking position, and through the insertion section 5 that is inserted into the coupling part 1. It can be seen from Fig. 2 that starting from the releasing position shown in Fig. 1, the locking part 20 has assumed the locking position in that, while a force sufficient to overcome the engagement of the latching projections 26, 27 with the releasing recesses 18, 19 is exerted on the top section 21 in the direction of the side sections 21, 22 by means of a fingertip or a tool, for example, with the action of additional force, the insides of the side sections 22, 23 slide along the sliding surfaces 14, 15 and the detent elements 24, 25 engage further into the guide recesses 13 of the coupling part 1. In the locking position, the latching projections 26, 27, which are not visible in Fig. 2, engage in the locking recesses 16, 17, also not visible, so that locking part 20 is also fixed in the locking position.

Fig. 3 shows a perspective view, partially cut away in the longitudinal direction in the transition region from one side section 22 into the top section 21, of the embodiment according to Fig. 1 and Fig. 2 with the locking part 20 in the locking position. It can be seen from Fig. 3 that a sealing ring 32 is arranged between the coupling part 1 and the insertion section 5 in the region of the insertion bevel 9 of the insertion section 5 in order to achieve a leakproof connection in the fluid conducting system. It can also be seen from Fig. 3 that the edge sides of the detent elements 24, 25 that face the connection fitting 2 rest on the first edge shoulder 7, which is adjacent to the free end of the insertion section 5, and thus hold the insertion section 5 in the coupling part 1 in an essentially play-free manner.

When the insertion section 5 is inserted into the coupling part 1 with the locking part 20 in the locking position, the detent elements 24, 25 of the locking part 20, which are also advantageously tapered in the direction of the insertion side 3 in the insertion direction, slide onto the insertion taper 9 until the detent elements 24, 25 engage behind the first edge shoulder 7 and the concavities of the detent elements 24, 25 enclose the insertion section 5 in sections in the region of the securing recess 6. The counterpart is thus coupled with the coupling part 1.

To transfer the locking part 20 from the locking position into the releasing position in order to release the insertion section 5, a fingernail or the front end of a screwdriver blade, for example, is applied alternately against the front faces 28, 29, which face away from the top section 21, in the region of the engagement recesses 30, 31 that are provided as a relief structure, in order to release the engagement of the latching projections 26, 27 with the locking recesses 16, 17 by means of a pushing movement on each in the direction of the top section 21.